SEVERE LOCAL STORMS, JANUARY 1944

(Compiled by Mary O. Souder)

[The table herewith contains such data as has been received concerning severe local storms that occurred during the month. A revised list of tornadoes will appear in the United States Meteorological Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Oklahoma	7-8					Snow	Snowfall which occurred mostly on the 7th and 8th, averaged 6.2 inches for the State. In only 3 of the past 44 years has the January snowfall been heavier. Main highways were blocked and secondary roads remained badly drifted for days. Traffic accidents were numerous.
Texas	13-14				$16,000,000	Glaze	A heavy accumulation of glaze caused tremendous damage to east Texas timberlands surrounding Lufkin and caused much damage to utility poles and wires in east-central portions of the State. Damage due to stripping of timber was estimated at $16,000,000, but no estimate on damage to utilities was obtainable.
Helena, Mont	17					Wind	Maximum velocities reported by the first-order Weather Bureau stations were from 40 to 56 miles per hour. Only minor damage to power and telephone lines, fences, signboards, and buildings. Reports from the area around Havre indicate that there was some damage to exposed winter wheat, amount not estimated.
Nebraska, extreme western and central portions.	26-27				100,000	Snow, wind, rain, and ice.	Greatest damage to telephone and other wires in central portion of the State. In the western part, considerable delay was experienced by motorists where roads were closed by drifts.
Oklahoma, central and western portions.	26-27	P. M.		2	155,000	Tornadoes and windstorms.	27 persons injured; property damaged.
South Dakota	26-28			1		Heavy rain, snow, and high wind.	Rain and snow, accompanied by near freezing temperature and high wind, blocked traffic, closed some schools, delayed railroad and bus service, and damaged telephone and power lines. A man died of exhaustion due to bad drifts at the Army Air Base in Rapid City.

SOLAR RADIATION AND SUNSPOT DATA FOR JANUARY 1944

[Solar Radiation Investigations Section, I. F. HAND, in charge]

SOLAR RADIATION OBSERVATIONS

MEASUREMENTS of solar radiant energy received at the surface of the earth are made at 10 stations maintained by the Weather Bureau and at 17 stations maintained by other institutions. The intensity of the total radiation from sun and sky on a horizontal surface is continuously recorded (from sunrise to sunset) at all these stations by means of self-registering instruments; pyrheliometric measurements of the intensity of direct solar radiation at normal incidence are made at frequent intervals on clear days at three Weather Bureau stations (Madison, Wis., Lincoln, Nebr., and Albuquerque, N. Mex.), and at the Blue Hill Observatory of Harvard University.

Table 1 contains the measurements of the intensity of direct solar radiation at normal incidence, with means and their departures from normal (means based on less than 3 values are in parenthesis). At Lincoln, Madison, Albuquerque, and Blue Hill the observations are obtained with a recording thermopile, checked by observations with a Smithsonian silver-disk pyrheliometer at Blue Hill. The table also gives vapor pressures at 7:30 a. m. and at 1:30 p. m. (75th meridian, E. S. T.).

Early in December 1943, an Eppley ten-junction pyrheliometer and a Leeds and Northrup micromax potentiometer were installed on top of one of the greenhouses of the Department of Horticulture, University of Missouri, Columbia, Mo. The equipment will be under the immediate supervision of Prof. A. E. Murneek, who intends to study the relationship between solar radiation values and the growth of tomato plants treated with hormones. All apparatus has been standardized and placed on the Smithsonian Scale of Pyrheliometry.

Prof. George O. G. Löf of the University of Colorado has installed radiation equipment to measure total solar and sky radiation at Boulder, Colo., in order to correlate insolation with house heating by solar energy. This station has the greatest elevation of any of those whose data appear regularly in the MONTHLY WEATHER REVIEW.

Solar radiation equipment has been installed also at the University of Los Angeles, under the direction of Prof. Charles P. Hedges.

In order to study the effect of atmospheric contamination, an Eppley ten-junction pyrheliometer and a Leeds and Northrup micromax potentiometer were recently installed at the city office of the Weather Bureau in Boston. This new site is 10 miles north of Blue Hill Observatory. Preliminary data show markedly the effect of city smoke in Boston. On January 18, a day without condensed water vapor clouds but with a heavy smoke pall over the city, the radiation on top of the 19-story Federal Building was less than one-tenth of that at Blue Hill for the hour ending at 9:00 a. m., solar time. The total radiation for the entire day was one-quarter less than that received at Blue Hill during the same period; the percentage loss of the ultraviolet is many times that of the visible or other components. This accounts to a large extent for the much greater percentage of cases of rickets in large industrial cities as compared with smaller towns or open country.

The coordinates of the four new stations are given in table 3.

Table 2 contains the daily amounts of radiation received on a horizontal surface from both sun and sky for all stations except Fairbanks, Alaska; and also the weekly means, their departures from normal and the accumulated departures since the beginning of the year. The values at most of the stations are obtained from the Eppley pyrheliometer, recording either on a microammeter or a potentiometer. If the daily values for total solar and sky radiation at Fairbanks should be desired, they may be obtained approximately 2 months after the date of the observation by writing to the Solar Radiation Investigations Supervisory Station, Blue Hill Observatory, Milton, Mass.

Table 3 gives information about the solar radiation stations which are maintained by, or cooperate with, the Weather Bureau.

TABLE 1.—*Solar radiation intensities during January 1944*

[Gram-calories per minute per square centimeter of normal surface]

Madison, Wis.

Date	Sun's zenith distance: 7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass: A. M.					P. M.				Local mean solar time
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.
	mb.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*
Jan. 7	0.70	------	0.80	0.95	------	------	------	1.14	------	------	1.73
8	.69	1.01	1.11	1.21	------	1.54	------	1.11	------	------	1.66
11	1.83	.88	.99	1.11	------	1.30	------	1.06	------	------	1.93
12	1.08	.75	.90	1.07	------	1.29	------	1.11	------	------	1.29
13	1.22	.88	1.04	1.14	------	1.46	------	1.13	------	------	1.93
14	2.74	.70	.84	1.04	------	1.40	------	1.02	------	------	3.83
15	2.03	.66	.83	.86	------	------	------	------	------	------	4.40
17	3.83	.39	.55	.75	------	1.25	------	.74	------	------	4.84
20	2.88	------	------	------	------	------	------	1.10	------	------	3.72
21	4.84	------	------	------	------	------	------	1.19	------	------	4.64
29	4.20	.95	1.07	1.22	------	1.57	------	1.01	------	------	5.82
Means	------	.78	.90	1.04	------	1.40	------	1.06	------	------	------
Departures	------	−.14	−.13	−.15	------	−.16	------	−.08	------	------	------

Albuquerque, N. Mex.

Date	Sun's zenith distance: 7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass: A. M.					P. M.				Local mean solar time
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.
	mb.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*
Jan. 1	2.13	0.96	1.07	------	------	------	------	------	------	------	3.65
3	3.32	.97	1.06	1.15	------	------	------	------	------	------	4.40
5	1.43	1.05	1.16	1.25	------	------	------	1.17	0.97	------	3.01
13	1.93	------	1.08	1.21	1.35	------	1.39	1.19	.90	------	2.75
16	2.61	1.05	1.13	1.21	------	------	1.33	1.12	------	------	5.56
19	3.01	------	1.10	1.21	1.33	------	------	------	------	------	4.20
20	3.01	1.04	1.08	1.15	1.21	------	1.11	1.02	.88	------	4.60
21	3.32	------	------	------	------	------	------	1.05	------	------	5.32
27	3.65	------	------	------	1.38	------	1.35	1.19	------	------	5.83
28	4.20	------	------	1.26	------	------	------	------	------	------	5.56
30	4.40	.94	------	1.15	1.32	------	1.35	------	------	------	5.83
Means	------	1.00	1.10	1.20	1.32	------	1.31	1.12	.92	------	------
Departures	------	−.05	−.05	−.07	−.09	------	−.17	−.09	−.17	------	------

*Extrapolated.

TABLE 2.—*Daily totals and weekly means of solar radiation (direct+diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

Date	Washington, D. C.	Madison, Wis.	Lincoln, Nebr.	East Lansing, Mich.	New York, N. Y.	Fresno, Calif.	Boston, Mass.	Nashville, Tenn.	Twin Falls, Idaho	La Jolla, Calif.	New Orleans, La.	Riverside, Calif.	Blue Hill, Mass.	Put-in-Bay, Ohio	Ithaca, N. Y.	Newport, R. I.	State College, Pa.	Los Angeles, Calif.	Davis, Calif.	East Wareham, Mass.
1944	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Jan. 1	189	129	159	39	171	180	------	179	73	281	------	261	205	29	100	172	43	264	52	191
2	118	97	180	100	121	173	------	13	80	160	------	84	206	85	99	209	99	64	70	190
3	21	170	41	83	17	173	------	9	150	246	------	192	89	44	56	14	260	84	72	
4	114	95	24	46	63	170	------	49	231	205	324	242	24	47	109	12	236	256	83	15
5	38	91	259	24	106	114	------	14	91	277	194	252	62	11	50	206	31	221	106	95
6	172	118	102	143	86	132	------	231	192	280	373	286	19	205	33	30	119	314	250	38
7	192	215	148	63	214	223	------	81	255	292	19	291	211	127	174	229	152	291	238	234
Mean	120	131	130	71	111	166	------	82	153	249	227	230	117	78	87	131	99	238	126	121
Departure	−45	+2	−38	−15	−6	+19	------	−26	+4	+3	+51	−16	−24	−12	−12	−15	−12	------	−39	−39
Jan. 8	110	270	249	135	160	268	------	36	163	236	75	241	211	128	113	199	108	279	209	216
9	272	148	256	72	226	251	------	177	231	300	299	262	247	138	140	238	248	292	73	256
10	174	184	261	131	185	169	------	275	137	128	394	141	234	125	140	209	191	140	150	223
11	211	227	260	84	133	152	------	227	226	288	224	300	193	150	141	197	158	275	257	212
12	201	240	281	75	190	266	------	168	239	308	36	299	169	139	175	188	196	304	227	179
13	210	227	293	116	232	251	------	180	176	294	25	304	251	239	124	236	250	312	87	260
14	267	211	268	169	151	224	------	100	116	314	40	302	94	222	131	86	217	314	228	70
Mean	206	215	267	112	182	226	------	166	184	267	156	264	200	163	138	193	195	274	176	202
Departure	+51	+79	+84	+1	+57	+66	------	+12	+29	+3	−57	+15	+36	+41	+27	+20	+54	------	−22	+28
Jan. 15	19	177	247	176	46	142	35	24	160	306	------	298	140	123	116	109	76	292	234	128
16	244	80	217	180	221	246	52	167	235	318	------	302	247	213	240	228	279	343	206	230
17	198	202	274	183	137	237	34	230	221	243	394	237	218	214	157	179	138	246	274	247
18	200	120	218	80	76	273	148	190	215	220	361	238	194	137	125	115	114	300	284	191
19	66	72	257	90	123	283	82	251	262	195	338	286	108	89	71	108	48	313	284	85
20	119	153	254	43	108	265	124	107	231	196	458	178	161	98	36	46	126	206	230	48
21	162	231	249	90	120	210	159	282	241	231	416	256	190	174	105	66	221	274	231	88
Mean	144	148	245	120	119	236	91	179	224	244	393	256	179	150	121	122	143	282	249	145
Departure	−14	−4	+55	−11	−3	+53	------	−5	+49	−20	+142	−25	+19	+10	+5	−46	+4	------	+38	−6
Jan. 22	227	141	299	54	121	253	220	249	198	172	294	158	234	134	219	230	137	269	235	217
23	142	242	126	140	99	183	24	253	88	111	419	89	29	172	26	41	79	56	116	31
24	258	63	117	114	238	105	242	210	64	240	248	158	256	142	232	266	224	234	309	264
25	238	101	192	41	97	272	135	114	148	314	76	226	205	192	44	199	164	295	317	166
26	242	68	62	155	37	186	14	118	283	------	184	177	41	207	95	55	204	203	158	68
27	212	17	233	13	154	253	119	181	138	286	233	214	158	68	10	151	82	212	281	144
28	161	94	315	94	12	238	144	306	263	326	126	265	197	267	52	175	236	344	134	204
Mean	211	104	192	87	108	213	128	204	169	241	226	184	160	169	97	160	161	230	221	156
Departure	+36	−76	−29	−51	−47	+10	------	+19	−11	−28	+5	−57	−16	+28	−39	−12	+39	------	+29	+18
ACCUMULATED DEPARTURES ON JANUARY 28, 1944																				
	+196	+7	+504	−532	+7	+1036	------	0	+497	−294	+987	−581	+105	+469	−133	−371	+595	------	+42	+7

TABLE 3.—*Pyrheliometric Stations*

Station	Under direction of—	North latitude	West longitude	Altitude	Instruments		Remarks
					Receiver	Recorder	
		° ′	° ′				
New Orleans, La.	Tulane University	29 56	90 07	100	Eppley	L&N potentiometer	Good exposure; considerable cloudiness.
La Jolla, Calif.	Scripps Institute of Oceanography.	32 52	117 15	90	do	Engelhard	Splendid exposure a few yards inland from Pacific Ocean. Early morning fogs prevail during part of year.
Riverside, Calif.	University of California	33 58	117 28	1,051	do	do	Excellent exposure in midst of citrus fruit region.
Los Angeles, Calif.	U. C. L. A., Physics—Meteorology.	34 04	118 26	535	do	G. E. potentiometer	(See text.)
Albuquerque, N. Mex.[1 2]	U. S. Weather Bureau	35 05	106 30	5,314	do	L&N potentiometer	At airport; dust at times. Second highest elevation of this group.
Nashville, Tenn.	do	36 07	86 41	600	do	do	At airport with good exposure, but records vitiated by soft-coal smoke in winter.
Fresno, Calif.	do	36 43	119 49	297	do	Engelhard	Good exposure at airport northern edge of city. The San Joaquin Valley has an exceedingly high percentage of sunshine.
Davis, Calif.	University of California	38 32	121 45	106	do	L&N potentiometer	Excellent exposure; little atmospheric contamination.
Washington, D. C.	U. S. Weather Bureau	38 56	77 05	397	do	do	Good exposure on second highest point in District of Columbia. 5½ miles northwest of United States Capitol. Some vitiation from city smoke.
Columbia, Mo.	University of Missouri	38 56	92 19	750	do	do	Free horizon; considerable soft-coal smoke.
Columbus, Ohio	Ohio State University	39 58	83 00	810	do	do	Considerable smokiness with light winds.
Boulder, Colo.	University of Colorado	40 00	105 16	5,428	do	Brown pyrometer	Normally clear air, low humidity, no dust or smoke.
New York, N. Y.	U. S. Weather Bureau	40 47	73 58	156	do	Engelhard	Fair exposure at Central Park Meteorological Observatory. Values vitiated by large city atmospheric contamination.
State College, Pa.	State College, Pa.	40 48	77 52	1,200	do	L&N potentiometer	Splendid exposure in farming country.
Lincoln, Nebr.[3]	U. S. Weather Bureau	40 49	96 42	1,250	do	do	Results very representative of the Great Plains area. Some dust.
Newport, R. I.[4]	Eppley Laboratory	41 30	71 19	52	do	do	Excellent location.
Put-in-Bay, Ohio	Franz Theodore Stone Biological Laboratory.	41 39	82 50	580	do	do	Almost no smoke or dust contamination. On an island 22 miles from the mainland.
East Wareham, Mass.	U. S. Bureau of Plant Industry in cooperation with Massachusetts Experiment Station.	41 46	70 40	50	do	Engelhard	Low ground; close to cranberry bogs and open water.
Chicago, Ill.[1]	U. S. Weather Bureau	41 47	87 25	688	do	do	Good exposure on roof of Rosenwald Hall, University of Chicago. A great deal of smoke.
Blue Hill, Mass.[5]	Harvard University	42 13	71 07	672	do	L&N potentiometer	Excellent exposure on high ridge 10 miles south of Boston. With northerly component winds, some smoke contamination from Boston.
Boston, Mass.	U. S. Weather Bureau	42 21	71 04	360	do	do	Serious smoke contamination. Free horizon.
Ithaca, N. Y.	Cornell University	42 27	76 29	836	do	do	Splendid site; data used by School of Agriculture.
Twin Falls, Idaho	U. S. Bureau of Entomology and Plant Quarantine.	42 27	114 34	3,730	do	Engelhard	Good exposure on high plateau in rich farming country.
East Lansing, Mich.	U. S. Soil Conservation Service in cooperation with Michigan Agricultural Experiment Station.	42 42	84 28	899	do	L&N potentiometer	Very little atmospheric contamination on low ridge dividing two watersheds.
Madison, Wis.[4]	U. S. Weather Bureau	43 05	89 23	974	do	do	Excellent exposure, North Hall, University of Wisconsin. Rapid growth of city has added to atmospheric vitiation recently.
Friday Harbor, Wash.[5]	University of Washington	48 32	123 01	15	do	Engelhard	Good exposure 50 miles northwest of Seattle directly on ocean; considerable fog interference.
Fairbanks, Alaska	University of Alaska	64 51	147 49	555	do	L&N potentiometer	Most northerly station of this kind in the world. Very little contamination.

[1] Temporarily abandoned.
[2] It is hoped that work will be resumed after the war.
[3] Measurements of total solar and sky radiation have been discontinued at Albuquerque until such time as a replacement potentiometer may be obtained. Normal incidence readings are made at this station by means of an Eppley normal-incidence pyrheliometer recording on a Bristol potentiometer.
[4] Besides the standard Eppley pyrheliometer and Leeds and Northrup potentiometer, the laboratory has precision equipment for the standardization of pyrheliometers.
[5] Station also equipped with normal-incidence pyrheliometers recording on Leeds and Northrup potentiometers. At Blue Hill several other types of solar observations also are made.